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Canadian Intellectual Property Office

(12) (19) (CA) **Demande-Application**

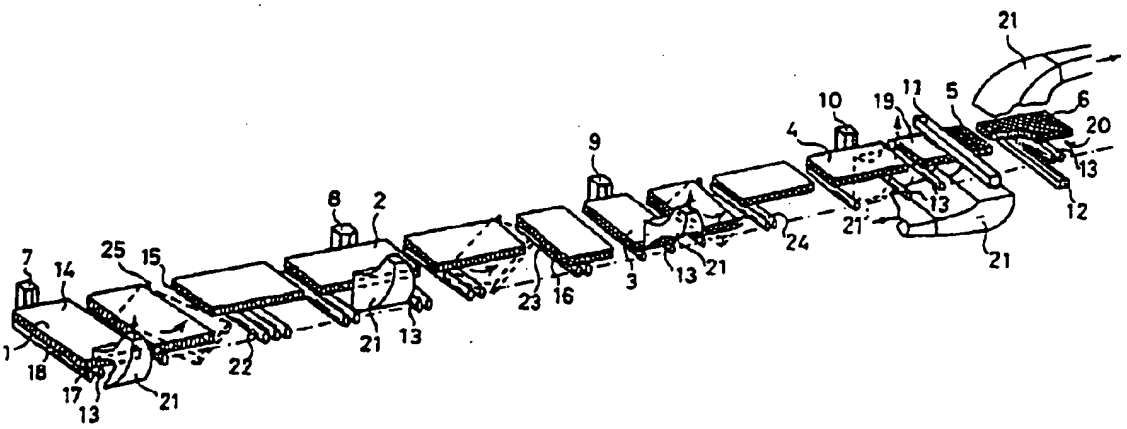
(21) (A1) **2,290,999**
(86) 1998/05/27
(87) 1998/12/03

(72) PETERSEN, CONNY, DK
(71) ROCKWOOL INTERNATIONAL A/S, DK

(51) Int.Cl.[7] D04H 1/56, D01D 5/098, B05C 9/04, B05B 13/02
(30) 1997/05/28 (DK 614/97) DK

(54) **INSTALLATION ET PROCEDE POUR ENDUIRE UN ELEMENT EN FIBRES MINERALES A PLUSIEURS COTES**

(54) **PLANT AND PROCESS FOR COATING A MULTI-SIDED MINERAL FIBRE ELEMENT**




(57) Cette invention se rapporte à une installation et à un procédé permettant d'enduire une couche de base en fibres minérales à plusieurs côtés avec un revêtement de surface se présentant sous la forme d'un tissu non tissé fibreux constitué par un matériau polymère thermoplastique sur au moins une partie d'au moins deux côtés de la couche de base, afin de former un élément en fibres minérales. Cette installation comprend au moins deux dispositifs de revêtement, un moyen permettant de faire fondre un matériau polymère thermoplastique, un moyen pour acheminer le matériau polymère fondu ainsi obtenu jusqu'aux dispositifs de revêtement, lesquels

(57) A plant and a process for coating a multi-sided mineral fibre base layer with a surface coating in the form of a fibrous non-woven fabric formed of a thermoplastic polymer material on at least part of at least two sides of the base layer fo form a mineral fibre element, wherein the plant comprises two or more coating devices, means for melting a thermoplastic polymer material, means for supplying the polymer melt obtained to the coating devices, wherein each coating device comprises a number of dispensing units comprising a number of orifices, means for extruding the polymer melt obtained through the orifices and

PCT ORGANISATION MONDIALE DE LA PROPRIETE INTELLECTUELLE
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DEMANDE INTERNATIONALE PUBLIEE EN VERTU DU TRAITE DE COOPERATION EN MATIERE DE BREVETS (PCT)

(51) Classification internationale des brevets 6 : C03C 17/42 — A1

(11) Numéro de publication internationale: WO 98/23549

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(21) Numéro de la demande internationale: PCT/FR97/02068

(22) Date de dépôt international: 18 novembre 1997 (18.11.97)

(30) Données relatives à la priorité:
96/14405 26 novembre 1996 (26.11.96) FR

(71) Déposant *(pour tous les Etats désignés sauf US)*: SAINT-GOBAIN VITRAGE [FR/FR]; 18, avenue d'Alsace, F-92400 Courbevoie (FR).

(72) Inventeurs; et

(75) Inventeurs/Déposants *(US seulement)*: AZZOPARDI, Marie-José [FR/FR]; 35, rue Condorcet, F-75009 Paris (FR). DELATTRE, Laurent [FR/FR]; 83, rue Château des Rentiers, F-75013 Paris (FR). TALPAERT, Xavier [FR/FR]; 46, avenue Simon Bolivar, F-75019 Paris (FR).

(74) Mandataire: LEBAS, Jean-Pierre; Saint-Gobain Recherche, 39, quai Lucien Lefranc, F-93300 Aubervilliers (FR).

(81) Etats désignés: JP, KR, US, brevet européen (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Publiée
*Avec rapport de recherche internationale.*

(54) Title: SUBSTRATE WITH IMPROVED HYDROPHILIC OR HYDROPHOBIC PROPERTIES, COMPRISING IRREGULARITIES

(54) Titre: SUBSTRAT A PROPRIETES HYDROPHILES OU HYDROPHOBES AMELIOREES, COMPORTANT DES IRREGULARITES

(57) Abstract

The invention concerns a substrate with at least one part of one of its faces having a geometry, optionally obtained by a coating, and which differs from that of that of an ideally even lap, perfectly plane or even slightly convex, in that it has a surface with bulges and hollows capable of being defined by submicron dimensions which, largely, belong to at least two different categories the respective representative values of which vary by a factor at least equal to 5 and at most equal to 1/5. This substrate is useful for an antisoiling and antimist or rainproof glazing. The invention also concerns the methods for preparing the substrate.

(57) Abrégé

Substrat dont au moins une partie d'au moins une des faces présente une géométrie, éventuellement obtenue au moyen d'un revêtement, et qui diffère de celle d'une nappe régulière idéale, parfaitement plane ou même légèrement bombée, en ce qu'elle présente un relief en bosses et creux pouvant être définis par des dimensions submicroniques qui, dans leur quasi-totalité, appartiennent à au moins deux classes différentes dont les valeurs représentatives respectives varient d'un facteur au moins égal à 5 ou au plus égal à 1/5; applications de ce substrat à un vitrage anti-salissures et anti-buée ou anti-pluie; procédés de préparation de substrat.

**PCT** WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C03B 18/00, 15/02, 13/00, 18/02, C03C 17/00, 25/02, B32B 17/06 — A1

(11) International Publication Number: WO 97/11916

(43) International Publication Date: 3 April 1997 (03.04.97)

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(30) Priority Data:
534,404 27 September 1995 (27.09.95) US

(60) Parent Application or Grant
(63) Related by Continuation
US 534,404 (CON)
Filed on 27 September 1995 (27.09.95)

(71) Applicant *(for all designated States except US)*: GLASSTECH, INC. [US/US]; Ampoint Industrial Park, 995 Fourth Street, Perrysburg, OH 43552 (US).

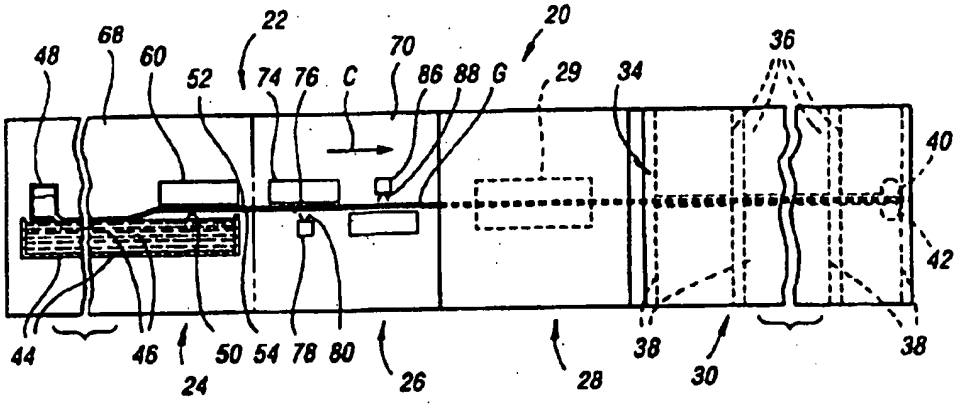
(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: MALTBY, Robert, J., Jr. [US/US]; 7869 McCutcheonville Road, Wayne, OH 43466 (US). VILD, Michael, J. [US/US]; 2526 Meadowwood Street, Toledo, OH 43606 (US). WETMORE, Kenneth, H. [US/US]; 647 Oak Knoll Drive, Perrysburg, OH 43551 (US).

(74) Agents: KUSHMAN, James, A. et al.; Brooks & Kushman, 1000 Town Center, Twenty-Second floor, Southfield, MI 48075 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).

Published
*With international search report.*

(54) Title: METHOD AND APPARATUS FOR COATING GLASS SHEET RIBBON AND RESULTANT COATED GLASS SHEET




(57) Abstract

Forming apparatus (22) and a method for forming a glass sheet ribbon (G) delivered from a flat tank (44) to a topside support dev ice (74) having a downwardly facing surface to which a vacuum and pressurized gas are suppplied to support the glass sheet ribbon (G) at its upper surface (52) while a coater (78) applies a coating (80) to its lower surface (54). Another coater (86) applies a coating (88) to the upper surface (52) of the glass sheet ribbon (G). A coated glass sheet (32) cut from the glass sheet ribbon (G) has at least one surface, and as disclosed both of its surfaces (52, 54), coated so as to be protected from deterioration caused by exposure to the atmosphere.

**PCT** WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C22C 33/02, C21D 7/00, 1/32 — A1

(11) International Publication Number: WO 97/42351

(43) International Publication Date: 13 November 1997 (13.11.97)

(21) International Application Number: PCT/CA97/00304

(22) International Filing Date: 2 May 1997 (02.05.97)

(30) Priority Data:
08/642,679 3 May 1996 (03.05.96) US

(71) Applicant: STACKPOLE LIMITED [CA/CA]; 2430 Royal Windsor Drive, Mississauga, Ontario L5J 1K7 (CA).

(72) Inventors: SHIVANATH, Rohith; 238 Aldercrest Road, Toronto, Ontario M8W 4J7 (CA). JONES, Peter; 3 Dalston Road, Toronto, Ontario M8W 4R4 (CA).

(74) Agent: GIERCZAK, Eugene, J., A.; Keyser Mason Ball, Suite 701, 201 City Centre Drive, Mississauga, Ontario L5B 2T4 (CA).

(81) Designated States: AL, AM, AU, AZ, BB, BG, BR, BY, CA, CN, CZ, EE, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, RO, RU, SD, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published
*With international search report.*

(54) Title: MAKING METAL POWDER ARTICLES BY SINTERING, SPHEROIDIZING AND WARM FORMING

(57) Abstract

A method of making a sintered article of powder metal having a carbon composition in the range of about 0.8 % to 2.0 % by weight, then shperoidizing the sintered article and then warm forming the sintered article at a temperature between 250 and 700 °C for a time duration selected to form the article to a final shape.

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(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: 03122274 A

(43) Date of publication of application: 24.05.91

(51) Int. Cl C23C 14/40
H01L 21/203
H01L 21/31

(21) Application number: 01258675

(22) Date of filing: 05.10.89

(71) Applicant: ASAHI GLASS CO LTD

(72) Inventor: MIYAMURA KENRO
KATAGIRI YOSHITAKA

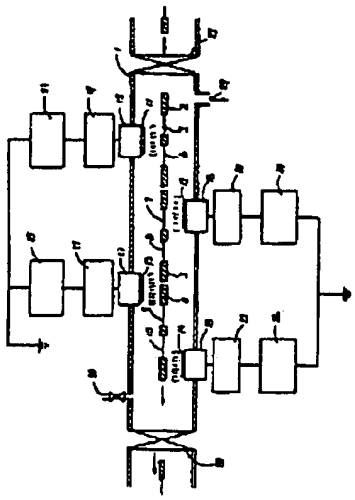
# (54) PRODUCTION OF THIN FILM AND DEVICE THEREOF

(57) Abstract:

PURPOSE: To stably obtain a stable discharge characteristic, uniform film thickness distribution and uniform film characteristics over a long period by alternately arranging targets for film formation on both surfaces of substrates apart to the distance at which the interference between high frequencies does not arise from the faced positions.

CONSTITUTION: The front and rear targets 11, 13 and 12, 14 of the device for inline production of thin films are alternately arranged apart to such distance at which the high-frequency powers to be impressed thereto do not interfere with each other. The distance to be parted is determined by the sizes of the cathodes and targets 11 to 14, the conditions of the film forming chamber, sputtering conditions, etc. Further, the substrates 5 to 10 and substrate holders 2 to 4 are rotated or advanced in parallel. The different regions of the substrate holders 2 to 4 act as anode in such a manner and the mutal interference between the front and rear high-frequency electric powers is lessened. The stable film deposition is, therefore, executed.





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? t s8/9/1

 8/9/1
DIALOG(R)File 351:Derwent WPI
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008999660    **Image available**
WPI Acc No: 1992-126940/199216
XRPX Acc No: N92-094653
  Optical magnifying power rate compensator for facsimile printer -
bends light flux direction change mirror to vary magnification of image
focused on photoreceptive plane  NoAbstract Dwg 1/6
Patent Assignee: ASAHI OPTICAL CO LTD (ASAO  )
Number of Countries: 001  Number of Patents: 002
Patent Family:
Patent No     Kind   Date     Applicat No    Kind   Date     Week
JP 4068856     A   19920304  JP 90178947     A   19900705  199216  B
JP 3187039     B2  20010711  JP 90178947     A   19900705  200140

Priority Applications (No Type Date): JP 90178947 A 19900705
Patent Details:
Patent No  Kind Lan Pg   Main IPC    Filing Notes
JP 4068856    A      4
JP 3187039    B2     4 H04N-001/028  Previous Publ. patent JP 4068856
Title Terms: OPTICAL; MAGNIFY; POWER; RATE; COMPENSATE; FACSIMILE;
PRINT; BEND; LIGHT; FLUX; DIRECTION; CHANGE; MIRROR; VARY; MAGNIFY;
IMAGE; FOCUS; PHOTORECEIVER; PLANE; NOABSTRACT
Derwent Class: P81; V07; W02
International Patent Class (Main): H04N-001/028
International Patent Class (Additional): G02B-007/19; G02B-007/198;
  G02B-017/00; H04N-001/02; H04N-001/04; H04N-001/19
File Segment: EPI; EngPI
Manual Codes (EPI/S-X): V07-K05; W02-J01A; W02-J02A1

? t s8/9/2

 8/9/2
DIALOG(R)File 351:Derwent WPI
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008780135    **Image available**
WPI Acc No: 1991-284152/ 199139
XRAM Acc No: C91-123031
XRPX Acc No: N91-217328
  Opto-magnetic recording medium with improved recording density - has
silicon carbide-nitride dielectric layer, magnetic layer and reflection
layer
Patent Assignee: SHINETSU CHEM IND CO LTD (SHIE  )
Number of Countries: 001  Number of Patents: 001
Patent Family:
Patent No     Kind   Date     Applicat No    Kind   Date     Week
JP 3187039     A   19910815  JP 89325208     A   19891215  199139  B

Priority Applications (No Type Date): JP 89325208 A 19891215
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(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: 03193872 A

(43) Date of publication of application: 23.08.91

(51) Int. Cl C23C 14/40
G11B 5/85

(21) Application number: 01332255

(22) Date of filing: 21.12.89

(71) Applicant: TDK CORP

(72) Inventor: MORITA HARUYUKI
KITAHARA YOSHIMI
UNO YASUSHI

(54) HIGH-FREQUENCY SPUTTERING METHOD AND PRODUCTION OF MAGNETIC RECORDING MEDIUM

(57) Abstract:

PURPOSE: To obtain a magnetic layer uniform in thickness and magnetic characteristic at the time of simultaneously forming a film by sputtering on both principal planes of a substrate by deviating the sputtering frequency on one side of the substrate from that on the other side by a specified frequency.

CONSTITUTION: A target is respectively opposed to the principal planes of a substrate, and a film is simultaneously formed on both principal planes of the substrate by high-frequency sputtering. In this case, when the frequency of the high-frequency sputtering performed on one principal plane of the substrate is estimated at fA MHz and that on the other principal plane at fB MHz, $0.0032 \le |fA-fB| \le 0.013$, $fA=13.56000 \pm 0.00678$ and $fB=13.56000 \pm 0.00678$ must be fulfilled. When |fA-fB| is less than the above-mentioned range, the uniformity in the film thickness is affected by the mutual intervention between the electric fields on both sides of the substrate, and the upper limit of |fA-fB| is obtained from the above-mentioned ranges of fA and fB.

**Glazing with multi-layer coating - providing chosen reflection colour esp. in blue region**
**Patent Assignee:** SAINT-GOBAIN VITRAGE; SAINT-GOBAIN VITRAGE INT
**Inventors:** BALIAN P; OUDARD J; ZAGDOUM G; BALLAN P; ZAGDOUN G; OUDARD J F

**Patent Family**

| Patent Number | Kind | Date | Application Number | Kind | Date | Week | Type |
|---|---|---|---|---|---|---|---|
| FR 2704545 | A1 | 19941104 | FR 935056 | A | 19930429 | 199444 | B |
| WO 9425410 | A1 | 19941110 | WO 94FR429 | A | 19940418 | 199444 | |
| NO 9404952 | A | 19941220 | WO 94FR429 | A | 19940418 | 199511 | |
| | | | NO 944952 | A | 19941220 | | |
| FI 9406122 | A | 19941228 | WO 94FR429 | A | 19940418 | 199512 | |
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| EP 648196 | A1 | 19950419 | EP 94913656 | A | 19940418 | 199520 | |
| | | | WO 94FR429 | A | 19940418 | | |
| CZ 9403335 | A3 | 19950816 | CZ 943335 | A | 19940418 | 199542 | |
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| | | | WO 94FR429 | A | 19940418 | | |
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| EP 648196 | B1 | 19990623 | EP 94913656 | A | 19940418 | 199929 | |
| | | | WO 94FR429 | A | 19940418 | | |
| DE 69419224 | E | 19990729 | DE 619224 | A | 19940418 | 199936 | |
| | | | EP 94913656 | A | 19940418 | | |
| | | | WO 94FR429 | A | 19940418 | | |
| RO 114784 | B1 | 19990730 | RO 2123 | A | 19940418 | 199941 | |
| | | | WO 94FR429 | A | 19940418 | | |
| ES 2135573 | T3 | 19991101 | EP 94913656 | A | 19940418 | 199953 | |
| BR 9405295 | A | 19990831 | BR 945295 | A | 19940418 | 200002 | |
| | | | WO 94FR429 | A | 19940418 | | |
| RU 2127231 | C1 | 19990310 | RU 9446262 | A | 19940418 | 200023 | |
| | | | WO 94FR429 | A | 19940418 | | |

**Priority Applications (Number Kind Date):** FR 935056 A ( 19930429)
**Cited Patents:** EP 114282 ; EP 441705 ; EP 501632 ; EP 511044 ; EP 518755 ; EP 530676 ; EP

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File 351:Derwent WPI  1963-2003/UD,UM &UP=200318
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DIALOG(R)File 351:Derwent WPI
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010223280    **Image available**
WPI Acc No: 1995-124535/199517
XPAI Acc No: C95-056715
XRPX Acc No: N95-098539
  Transparent glass substrate with multiple coatings - to improve light
  transmission to solar factor ratio
Patent Assignee: SAINT-GOBAIN VITRAGE (COMP  ); SAINT-GOBAIN VITRAGE
INT  (COMP  )
Inventor: GUISELIN O
Number of Countries: 016  Number of Patents: 008
Patent Family:
Patent No     Kind   Date     Applicat No    Kind   Date     Week
EP 645352      A1  19950329  EP 94402051     A   19940914  199517  B
FR 2710333     A1  19950331  FR 9311339      A   19930923  199518
CA 2132254     A   19950324  CA 2132254      A   19940916  199525
JP 7149545     A   19950613  JP 94229824     A   19940926  199532
US 5595825     A   19970121  US 94309652     A   19940921  199710
EP 645352      B1  19980617  EP 94402051     A   19940914  199828
DE 69411107    E   19980723  DE 611107       A   19940914  199835
                             EP 94402051     A   19940914
ES 2119110     T3  19981001  EP 94402051     A   19940914  199848

Priority Applications (No Type Date): FR 9311339 A 19930923
Cited Patents: DE 4211363; EP 303109; EP 332717; EP 456487; FR 2669325;
GB 2027925; US 5071206; US 5229881; WO 9002653; WO 9005439
Patent Details:
Patent No  Kind Lan Pg   Main IPC    Filing Notes
EP 645352     A1 F   6 C03C-017/36
   Designated States (Regional): AT BE CH DE DK ES FR GB IT LI LU NL SE
FR 2710333    A1    15 C03C-017/34
CA 2132254    A  F     G02B-005/26
JP 7149545    A      6 C03C-017/34
US 5595825    A      6 B32B-017/06
EP 645352     B1 F     C03C-017/36
   Designated States (Regional): AT BE CH DE DK ES FR GB IT LI LU NL SE
DE 69411107   E        C03C-017/36   Based on patent EP 645352
ES 2119110    T3       C03C-017/36   Based on patent EP 645352

Abstract (Basic): EP 645352 A
        The glass substrate (1) is successively coated with a first
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Diamond and Related Materials, 2 (1993) 782–787



# Optical and electronic properties of amorphous diamond

V. S. Veerasamy, G. A. J. Amaratunga, W. I. Milne and P. Hewitt
*Engineering Department, Cambridge University, Trumpington Street, Cambridge (UK)*

P. J. Fallon
*Cavendish Laboratory, Cambridge University, Cambridge (UK)*

D. R. McKenzie and C. A. Davis
*School of Physics, University of Sydney, NSW 2006 (Australia)*

## Abstract

The optical and electronic properties of highly tetrahedral amorphous diamond-like carbon (amorphous diamond, a-D) films were investigated. The structure of the films grown on silicon and glass substrates, under similar deposition conditions using a compact filtered cathodic vacuum arc system, are compared using electron energy loss spectroscopy (EELS). Results from hydrogenation of the films are also reported. The hydrogenated films show two prominent IR absorption peaks centred at 2920 and 2840 $cm^{-1}$, which are assigned to the stretch mode of the C–H bond in the $sp^3$ configuration on the $C-H_2$ and C–H sites respectively. The high loss EELS spectra show no reduction in the high $sp^3$ content in the hydrogenated films. UV and visible transmission spectra of a-D thin films are also presented. The optical band gap of 2.0–2.2 eV for the a-D films is found to be consistent with the electronic bandgap. The relationship between the intrinsic compressive stress in the films and the refractive index is also presented. The space charge limited current flow is analysed and coupled with the optical absorption data to give an estimate of $10^{18}$ $cm^{-3}$ $eV^{-1}$ for the valence band edge density of states.

## 1. Introduction

The filtered cathodic vacuum arc (FCVA) system has recently emerged as a viable technique for depositing thin films [1]. The high kinetic energy of the ions (about 22 eV [2]) in the emitted flux enables deposition of dense homogeneous films. Highly tetrahedral amorphous carbon or "amorphous diamond" (a-D) films under high compressive stress have been successfully deposited using the plasma stream from a cathodic vacuum arc [2, 3]. Filtering by means of a curved magnetic solenoid is essential for the removal of neutral vapour and macroscopic particles of graphite from the arc beam during a-D deposition.

In this paper, we show that hydrogenation of the films, without reducing the $sp^3$ diamond-like bonding in the material, can be achieved. The films are examined using electron energy loss spectroscopy (EELS) spectra and optical transmission spectra. A major part of this paper is concerned with the examination of the electronic conduction process in a-D.

## 2. Experimental method

The FCVA film deposition apparatus used is schematically shown in Fig. 1. The plasma gun and coating chamber are separately pumped to give a base pressure below $1 \times 10^{-7}$ Torr. A liquid nitrogen trap is also fitted just below the deposition chamber to reduce contamination by hydrocarbons (pump oil). The cathode is made of a high density and purity graphite disc 70 mm in diameter. The arc is ignited by bringing a graphite rod, which is connected to the anode (earthed), into contact

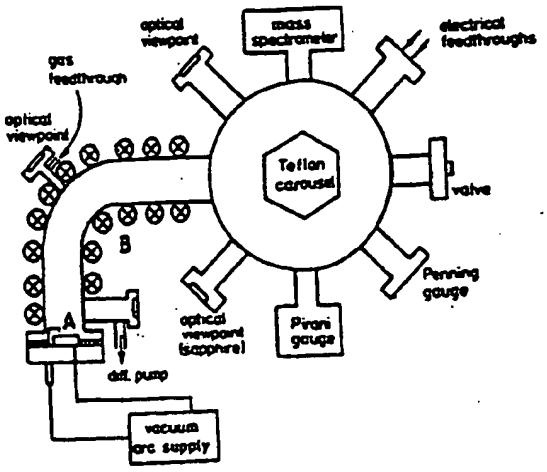


Fig. 1. Schematic diagram of filtered vacuum arc deposition unit.



ENDOCOR: 0925-9635(93)E0056-00

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**End of Result Set**

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L21: Entry 26 of 26 File: TDBD Jan 1, 1993

TDB-ACC-NO: NN9301225

DISCLOSURE TITLE: Surface Hardening of Ceramic and Glass Materials.

PUBLICATION-DATA:
IBM Technical Disclosure Bulletin, January 1993, US

VOLUME NUMBER: 36
ISSUE NUMBER: 1
PAGE NUMBER: 225

PUBLICATION-DATE: January 1, 1993 (19930101)

CROSS REFERENCE: 0018-8689-36-1-225

DISCLOSURE TEXT:

- This invention describes a structure and method for enhancing the properties of glass and ceramic materials by surface coating with amorphous diamond, which induces high compressive stress into the surface, provides coating of micro voids and cracks in the surface with a material that has the intrinsic properties of diamond and provides the surface with the chemical stability of diamond. Films of pure amorphous carbon with a high fraction of sp3 bonds have been prepared by ion beam, laser beam and cathodic arc deposition. The properties of these films approach that of diamond as the sp3 fraction increases. Some cathodic arc deposited carbon has sp3 content of about 90 percent and the elastic constant and hardness measured essentially that of diamond, i.e., 1100 GPa and 90 GPA respectively. The films have a very large compressive stress, which will further enhance the stability of the material coated. We see the coating of glass or ceramic materials with amorphous dense carbon as a way to improve the properties of these materials and to maintain these property enhancements due to the chemical stability provided by the surface. - Griffith and Orocoan have shown that in amorphous materials brittle fracture occurs when initiated by micro-cracks through tensile failure. If the surface can be protected from scratches, atmospheric erosion and reaction or that the surface could be enhanced in compressive stress or, better still, all of the above; then the material will retain or be enhanced in its brittle fracture behaviors. Ceramics exhibit similar behavior to glass in terms of its brittle fracture behavior. The strengths of ceramics are low under tensile load, but exhibit high compressive strengths and can sustain appreciable loads.